WHAT IS CLAIMED IS:

1. A dynamo-electric machine including a stator having a primary winding and a rotor having a field magnet and a shaft, wherein said field magnet comprises a first field magnet having diferent polarity magnetic poles sequentially arranged in a rotation direction and a second field magnet having diferent polarity magnetic poles sequentially arranged in a rotation direction, further comprising;

a mechanism for shifting the first and the second field magnets in axial and rotation directions.

2. A dynamo-electric machine including a stator having a primary winding and a rotor having a field magnet and a shaft, wherein said field magnet comprises a first field magnet having diferent polarity magnetic poles sequentially arranged in a rotation direction and a second field magnet having diferent polarity magnetic poles sequentially arranged in a rotation direction, further comprising;

a mechanism for shifting one field magnet in axial and rotation directions with respect to the other field magnet.

3. The dynamo-electric machine according to claim 1 or 2, wherein a resultant magnetic field of the first field magnet and the second field magnet is changed to said stator by using said mechanism for shifting one field magnet in axial and rotation directions with respect to the other field magnet.

4. A transport system comprising:

a dynamo-electric machine in which a resultant magnetic field of the first field magnet and the second field magnet is changed, comprising a stator with a primary winding and a rotor with a field magnet and a shaft, said field magnet including a first field magnet having diferent polarity magnetic poles sequentially arranged in a rotation direction and a second field magnet having diferent polarity magnetic poles sequentially arranged in a rotation direction, and said dynamo-electric machine further comprising a mechanism for shifting one field magnet in axial and rotation directions with respect to the other field magnet;

a truck of which a power source is said dynamo-electric machine;

a current collector which takes the electric power from the outside to said truck; and

a power converter for controlling the electric power of said dynamo-electric machine.

5. A rolling stock system comprising:

a dynamo-electric machine in which a resultant magnetic field of the first field magnet and the second field magnet is changed, comprising a stator with a primary winding and a rotor with a field magnet and a shaft, said field magnet including a first field magnet having diferent polarity magnetic poles sequentially arranged in a rotation direction and a second field magnet having diferent polarity magnetic poles

sequentially arranged in a rotation direction, and said dynamo-electric machine further comprising a mechanism for shifting one field magnet in axial and rotation directions with respect to the other field magnet;

an electric car of which a power source is said dynamo-electric machine;

a current collector which takes the electric power from the outside to said electric car; and

a power converter for controlling the electric power of said dynamo-electric machine.

6. The transport system according to claim 4, wherein said dynamo-electric machine has a stator with a primary winding and a rotor with a field magnet and a shaft, said field magnet including a first field magnet having diferent polarity magnetic poles sequentially arranged in a rotation direction and a second field magnet having diferent polarity magnetic poles sequentially arranged in a rotation direction, said first and said second field magnets is opposed to a magnetic pole of said stator, and said dynamo-electric machine further comprising a mechanism for changing the resultant magnetic field of said first and said second field magnets according to a direction of the torque of said rotor,

wherein said changing mechanism comprises;

a means for arranging the centers of the equal-polarity of said the

first field magnet and the second field magnet according to the balance of the direction of the torque generated by said rotor and the magnetic action force between the first field magnet and the second field magnet, and

a means for changing the resultant magnetic field of the first field magnet and the second field magnet as the direction of the torque generated in said rotor reverses.

7. The transport system according to claim 4,

wherein said means for arranging the centers of the equal-polarity of said the first field magnet and the second field magnet according to the balance of the direction of the torque generated by said rotor and the magnetic action force between the first field magnet and the second field magnet is used when said dynamo-electric machine is at low speeds, and said means for changing the resultant magnetic field of the first field magnet and the second field magnet as the direction of the torque generated in said rotor reverses is used when said dynamo-electric machine are at a high speed.

8. The dynamo-electric machine according to any one of claims 1-6, wherein the first field magnet and the second field magnet can move freely with respect to the shaft in axial and rotation directions, and the screw functions are provided by forming a screw portion in the shaft and nut portions inside the first and the second field magnets to form the

mechanism for shifting both of the field magnets in axial and rotation directions.

9. The dynamo-electric machine according to any one of claims 1-6, whereinone field magnet is fixed to the shaft and the other field magnet can move freely with respect to the shaft, and the screw functions are provided by forming a screw portion in the shaft and nut portions inside the other field magnet to form the mechanism for shifting one field magnet with respect to the other field magnet.

10. The dynamo-electric machine according to claim 8 or 9, wherein at least one field magnet can move freely with respect to the shaft, the screw functions are provided by forming a screw portion in the shaft and nut portions inside the other field magnet,and a stopper is provided at the position spaced from the side of said movable field magnet.

11. The dynamo-electric machine according to claim 10, wherein said stopper has a mechanism which can move in parallel to the shaft if necessary.

12. The dynamo-electric machine according to any one of claims 1-6, wherein the phase lead of the current-feed by the controller for controlling said power converter is corrected according to the displacement of the position of a resultant magnetic pole of said first

field magnet and said second field magnet.

13. The dynamo-electric machine according to any one of claims 1-6, wherein at least one or more field magnets are provided movably and freely with respect to the shaft, the screw functions are provided by forming a screw portion in the shaft and nut portions inside said field magnet, the magnitude of the displacement in an axial direction of said movable field magnet is detected, and the phase lead of the current-feed by the controller for controlling said power converter is corrected according to the displacement of the position of a resultant magnetic pole of said first field magnet and said second field magnet.

14. The dynamo-electric machine according to any one of claims 1-6, wherein at least one or more field magnets are provided movably and freely with respect to the shaft, and a plurality of support mechanisms for guiding the rotary motion, and whereby the reciprocal motion and the compound movement are provided between said movable field magnet and said shaft.

15. The dynamo-electric machine according to any one of claims 1-6, wherein said movable field magnet and a sleeve are fixed through the sleeve between the inside of said movable field magnet and the shaft.

16. The dynamo-electric machine according to claim 15, wherein said

sleeve comprises non-magnetic substance whose electrical resistivity is higher than iron.

17. The dynamo-electric machine according to any one of claims 1-6, wherein at least one or more field magnets are provided movably and freely with respect to the shaft, and a plurality of springs provided before and behind said field magnet, for guiding the rotary motion, the reciprocal motion and the compound movement are provided between said movable field magnet and said shaft.

18. The dynamo-electric machine according to any one of claims 1-6, wherein said the first field magnet are fixed to the shaft, and said the second field magnets are provided movably and freely with respect to the shaft, a concave part is provided to the side of said the first field magnet where the first field magnet and the second field magnet faces, and a protruding portion by which the function of said sleeve is held concurrently is provided to said second field magnet.

19. The dynamo-electric machine according to any one of claims 1-6, wherein at least one or more field magnets are provided movably and freely with respect to the shaft, and a plurality of springs provided before and behind said field magnet, for guiding the rotary motion, the reciprocal motion and the compound movement are provided between said movable field magnet and said shaft.

20. The dynamo-electric machine according to any one of claims 1-6, wherein said first field magnet are fixed to the shaft, and said second field magnets are provided movably and freely with respect to the shaft, and the size of the airgap between said rotor having the second field magnet and said stator is larger than the size of the airgap between said rotor having the first field magnet.

21. The dynamo-electric machine according to any one of claims 1-6, wherein at least one or more field magnet are provided movably and freely with respect to the shaft, and said stopper and a movable mechanism of said stopper are provided inside said movable field magnet.

22. The dynamo-electric machine according to any one of claims 1-6, further comprising a mechanism for switching the direction of the rotaiton of the power output shaft.

23. The dynamo-electric machine according to claim 22, wherein the switching mechanism has the gear for reversing the rotation and the clutch mechanism.

24. The dynamo-electric machine according to any one of claims 1-6, further comprising a third field magnet provided between the first and

the second field magnets, having diferent polarity magnetic poles sequentially arranged in a rotation direction.

25. The dynamo-electric machine according to claim 1 or 24, wherein said first and said second field magnets can move freely with respect to the shaft, and the screw functions are provided by forming a screw portion in the shaft in the same direction and nut portions inside said first and said second field magnets to form the mechanism for shifting one field magnet with respect to the other field magnet.